NOMOGRAPHS FOR THE SOLUTION OF PSYCHROMETRIC PROBLEMS [1]

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THE nomographs presented in figures 1 and 2 facilitate psychrometric calculations on the basis of given dry-bulb and wet-bulb temperatures obtained at specified barometric pressures. In addition to dewpoint and relative humidity data, the heat content and the mixing ratio may be obtained within the limits shown upon the charts. Figure 1 is used with metric, and figure 2, with English units.

Near the foot of the diagrams are scales for determining (1) the heat content or enthalpy [2], (2) the vapor pressure, and (3) the mixing ratio. Heat content, which is a function of the wet-bulb temperature, is expressed in terms of the unit: kilocalories per kilogram of dry air above 0°C. in the metric system, and B.t.u. per pound of dry air above 0°F. in the English system. The vapor pressure, determined from the dewpoint, is given in millimeters of mercury or inches of mercury. Units of mixing ratio are grams of water vapor per kilogram of dry air and grains of water vapor per pound of dry air.

A transverse line divides the relative humidity scale into two parts. The upper (high humidity) portion bears the legend, "Use with scale I," while the lower (low humid-

ity) portion carries the legend, "Use with scale II." These legends refer to the two dewpoint scales, designated "I" and "II," respectively, barometric pressure assumed to be 760 millimeters or 29.92 inches of mercury.

In the use of the nomographs, the dewpoint scale to be used is determined from the legend applying to that section of the humidity scale on which the relative humidity is found. (See par. 2, below.)

USE OF NOMOGRAPH

1. Connect the dry-bulb temperature and the wet-bulb temperature by a straight edge.
2. Obtain the relative humidity from the scale captioned "Relative humidity," at the point of intersection of the straightedge with the curve corresponding to the barometric pressure; at the same time, note which of the two legends, "Use with scale I" or "Use with scale II," applies to the point just determined.
3. Obtain the dewpoint from the dewpoint scale headed with the roman numeral I or II, specified in the legend noted. Read the dewpoint value at the intersection of the straightedge with the curve pertaining to the appropriate pressure.

Data for the construction of the nomographs were taken from "Psychrometric Charts for High and Low Pressures", by Donald B. Brooks, U. S. Department of Commerce Bulletin M–146, and from "Chemische Ingenieur Technik," vol. 2, pages 618–634, by E. Berl.
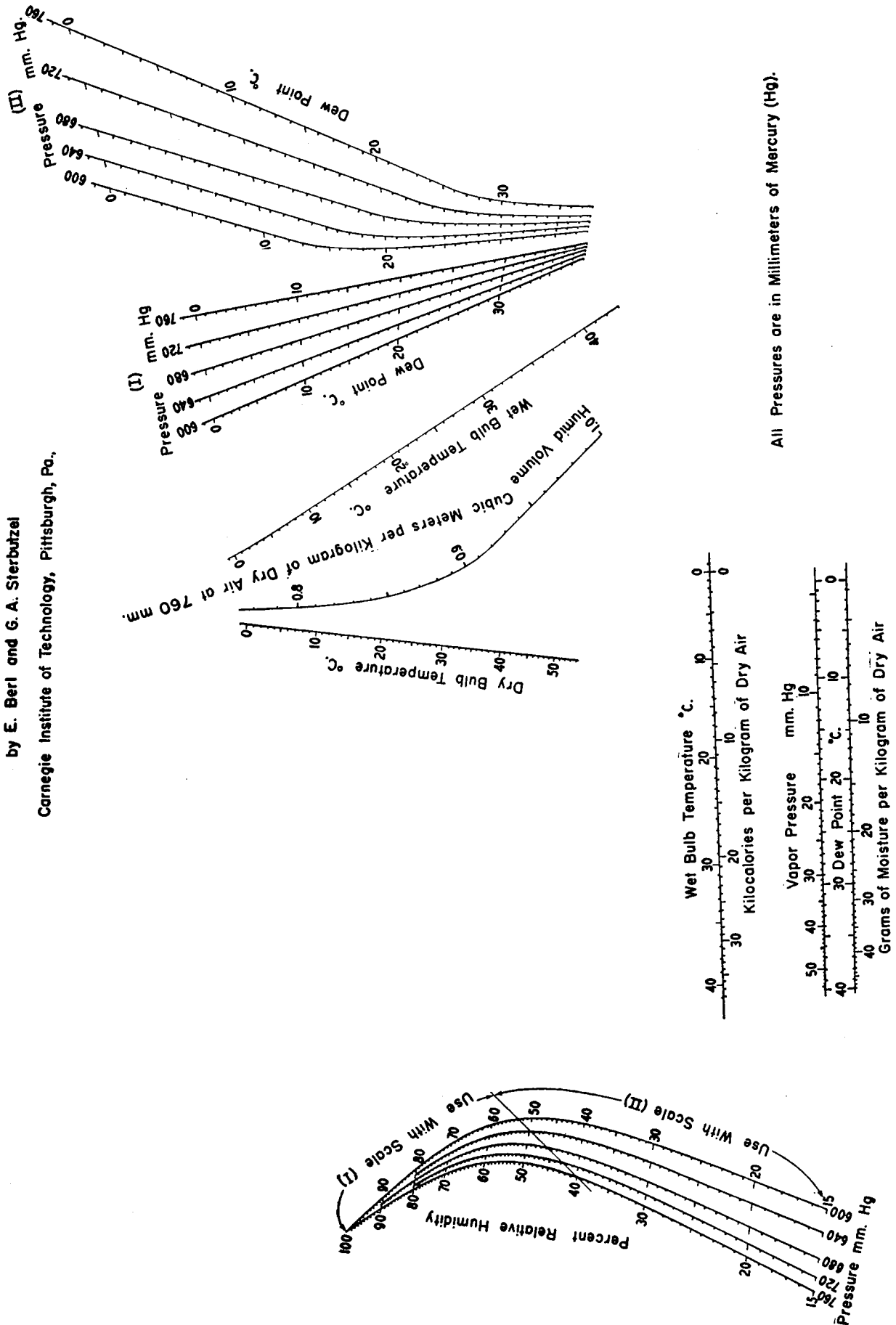
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NOMOGRAPH FOR THE DETERMINATION OF PSYCHROMETRIC DATA

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All Pressures are in Millimeters of Mercury (Hg).

Fig. 1

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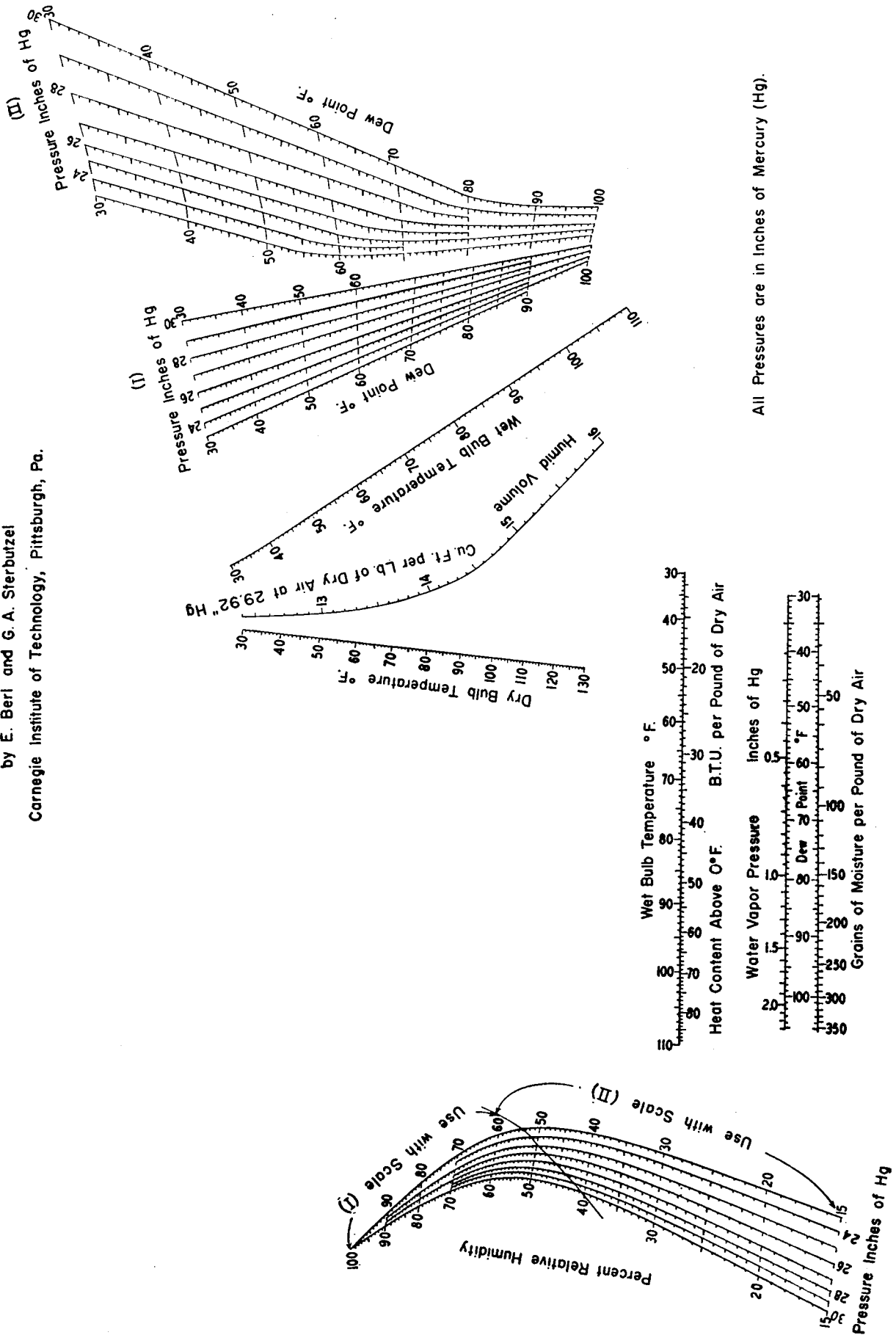
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Fig. 2

All Pressures are in Inches of Mercury (Hg).